Studies in Cyperaceae in southern Africa. 16: A re-examination of *Schoenoplectus paludicola, Sch. decipiens* and *Sch. pulchellus*

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Clarke (1898), and other authors of about the same period, regarded *Scirpus paludicola* Kunth as a single species including within its limits three entities previously accepted as independent species by Kunth (1837). Raynal (1976) was prompted to reconsider Kunth's earlier interpretation. Study resulted in the re-establishment of three species, but within *Schoenoplectus* (Reichenbach) Palla, previously a section within *Scirpus* L. Raynal expressed the need for further study of the distribution of these species in eastern southern Africa where they appeared sympatric. Such study has revealed a range of variability for *Sch. decipiens* previously unrecorded and requiring a new key for identification. Distribution maps uphold Raynal's tentative observation that altitudinal preferences isolate, in part at least, the ranges of *Sch. decipiens* and *Sch. paludicola. Sch. pulchellus* is still imperfectly known. Further detailed field study of all three taxa is required in the eastern Cape Province and the south-eastern Transvaal. Descriptions, illustrations and electron micrographs are included.

Clarke (1898) en van sy tydgenote het *Scirpus paludicola* Kunth as 'n enkel spesie beskou en binne die limiete van die spesie drie ander entiteite, wat voorheen as aparte spesies deur Kunth 1837 beskou is, ingesluit. Raynal (1976) is aangespoor om Kunth se vroeër interpretasie te heroorweeg. Studies het daartoe gelei dat drie spesies heringestel is, maar binne *Schoenoplectus* (Reichenbach) Palla, wat voorheen 'n seksie binne *Scirpus* L. was. Raynal het die noodsaaklikheid vir verdere bestudering van die verspreiding van hierdie taksons in oostelike Suidelike Afrika, waar hulle simpatries verskyn, voorgestel. 'n Sodanige studie het op 'n verskeidenheidsreeks vir *Sch. decipiens* gewys wat vroeër nie aangetoon is nie en het dus 'n nuwe sleutel vir identifikasie benodig. Verspreidingskaarte onderskraag Raynal se tentatiewe waarneming dat voorkeure volgens hoogte bo seespieël, ten minste gedeeltelik, die verspreiding van *Sch. decipiens* en *Sch. paludicola* bepaal. *Sch. pulchellus* is steeds onvolledig bekend. 'n Verdere gedetailleerde basisstudie van al drie taksons word benodig vir die oostelike Kaapprovinsie en oostelike Transvaal. Beskrywings, illustrasies en elektronmikrograwe is in hierdie artikel ingesluit.

Keywords: *Schoenoplectus decipiens, Sch. paludicola, Sch. pulchellus*, southern Africa, taxonomy

Introduction

Following upon study of specimens in the herbaria of Paris (P) and London (BM, K), and keenly aware of heterogeneity within the Linnaean genus *Scirpus*, Raynal (1976) was prompted to take up a distinction proposed more than 150 years ago, but subsequently disregarded. This distinction concerned *Scirpus paludicola* Kunth which Clarke (1898) had treated as a species comprising plants from eastern southern Africa; plants that earlier had been known under several binomials, namely *Isolepis decipiens* Nees (1835: 157) syn. *Isolepis paludicola* Kunth (1837: 198), *Scirpus paludicola* Kunth (1837: 163) and *Ficinia pulchella* Kunth (1837: 261). These taxa were all based on different gatherings from the eastern Cape. Florets of *Isolepis decipiens* lacked the bristles that were developed in *Scirpus paludicola*; in *Ficinia pulchella* a hypogynous disc carrying small outgrowths was present. Clarke (1898) mentioned the lack of bristles in Nees' species, but regarded this as a form within the range of variation of *Scirpus paludicola s.l.* He included *Ficinia pulchella* in the synonymy of *Scirpus paludicola*, undoubtedly regarding the hypogynous disc with its short outgrowths as a reductional expression of the typical form. Adding to Clarke's impressions of relationship, as Raynal (1976) so rightly pointed out, was the homonymy engendered by Kunth's use of the epithet '*paludicola*'.

Raynal's re-examination revealed that others beside himself had noted the lack of uniformity within the taxon delimited by Clarke (Turrill in a note on *Dieterlen 1335*, K; Schuyler, comm. verb. 1966), no one of whom, however, had followed the matter far. Raynal considered it worth pursuing, particularly considering growing opinion favouring the dismantling of *Scirpus*. In his paper (Raynal 1976), he gave a foreword recalling the history and value of the genus *Schoenoplectus* (Reichenbach) Palla (1888), formerly a section within *Scirpus*, and within it, established as distinct species, *Sch. paludicola, Sch. decipiens* and *Sch. pulchellus*, giving the synonymy, the distinctive characters and the known geographical distribution of each. The geographical distribution suggested to him that the three species were sympatriots in a vast region in the south-east of South Africa. He drew the tentative conclusion that *Sch. decipiens* seemed to favour mountainous regions to a greater extent than did *Sch. paludicola*, but proposed there should be verification of this hypothesis by further study. The present paper takes up this study.

Materials and Methods

Material from South African herbaria and Kew Herbarium was examined, primarily with distribution in mind, but with attention paid to variability within the species, since Raynal had accounted for main distinctions only. Plants in the living state, directly from the field, were also studied, particularly in relation to underground organs and glume coloration. Unfortunately, *Schoenoplectus pulchellus* was not located. Measurements of 100 gatherings of *Schoenoplectus paludicola*, from throughout its distributional range were recorded, and comparable parameters obtained from all available material of the other two taxa (74 in *Sch. decipiens*; 12 in *Sch. pulchellus*). Light and electron microscopy were employed in the examination of micromorphological features. Distribution maps were prepared.

Results and Discussion

When Clarke (1898) dealt with *Scirpus paludicola*, the material available to him was scant and mainly from the eastern Cape Province [*Buchanan 163* from the Orange Free State is *Scirpus (Schoenoplectus) muricinux*]. Specimens now known from the Free State, the Transvaal and Lesotho are mostly of more recent collection.

Raynal's (1976) re-examination showed conclusively that three entities, apparently clearly discontinuous morphologically, and quite easily differentiated on the basis of characters used in the key he provided, had been grouped under one species by Clarke.

The present study has supported Raynal's finding of three distinct entities (species), but has revealed variability within *Sch. decipiens*, in particular, quite beyond limits recorded by Raynal. This variability has necessitated re-statement of features by which identification is ensured, so that a new key has been devised. Recorded geographic distribution has also been elucidated, but a lack of knowledge still remains, especially with respect to *Sch. pulchellus*.

The three taxa will now be considered individually from aspects of morphological variability and distribution.

Schoenoplectus paludicola

Variability

Throughout its range of distribution, this species was remarkably uniform in vegetative habit and in qualitative and quantitative features of the reproductive organs. The inflorescence showed a range from an anthela with 5–1 branches, about 10 mm long, to a single head. Glumes, stamens and achenes showed limited size ranges (see Table 1). Greatest variability was in the hypogynous perianth bristles. Both Clarke (1898) and Raynal (1976) recorded 5–6 per floret. The present study revealed the following facts concerning these structures:

1. In early stages of development of the floret, the bristles are large and obvious.
2. 96% of florets examined showed bristles; of these only 8.3% showed six bristles; the remainder developed only five, of which four were attached to the abaxial surface of the achene base, the fifth to the adaxial surface. This adaxial bristle was frequently contorted (Figure 1F), more rarely straight (Figure 5B).
3. Bristle length varied on different achenes within a spikelet and no pattern emerged relating to their arrangement (apart from 2 above), length, and ratio of length to achene length.

Distribution and Habitat

Plants occur commonly along the eastern coast of South Africa from 27°–34°S latitude and from 32°–20.5°E longitude, in wet, or temporarily wet situations (vleis, rivers, dams, marshy ground and temporary pools) from sea-level to 1 350 m. The heights of the Drakensberg seem to have served as a barrier to inland migration. There is an apparent distributional hiatus along the southern coast between 25° and 22.5°E longitude. Whether this is real, or the result of problems of collection and availability of specimens, requires further investigation. (Figure 8).

Schoenoplectus decipiens

Variability

Rhizome and inflorescence

On the basis of rhizome (when represented), herbarium sheets mainly fell into one of two categories, namely:

1. Rhizome with extended internodes, the erect shoots widely separated one from another, giving a non-tufted appearance to the plant (Figure 2A). Such rhizomes generally carried pseudolateral inflorescences with little, if any, apparent branching. The majority of specimens from the Transvaal, the Orange Free State and Lesotho fell into this group.
2. Rhizome abbreviated, the erect shoots closely placed and giving a tufted appearance to the plant (Figure 2B). The inflorescences were usually anthelate, that is branches were developed. With one or two exceptions, plants were from the Cape Province and in general facies resembled *Sch. paludicola*.

Living material from a population at Franklin (*Taylor 17, 37*, NU) was examined. The rhizomes showed variability from extended lengths with widely spaced aerial shoots (1) to tufted sequences (2). The latter were infrequent and occurred part way along elongate

Table 1 Characters and parameters differentiating the species (all dimensions in mm)

Taxon	Glume Length	Anther Length	Achene Length	Bristle number
Sch. paludicola	1.9–2.8	0.4–0.5	1.2–1.7	Usually 5; occasionally 6
Sch. decipiens	2.8–4.5	1.0–1.75	1.3–1.9	No bristles; or bristles 1–6
Sch. pulchellus	1.47–1.75	0.25–0.32	0.7–0.95	No bristles – bases of 2–3 remnants present

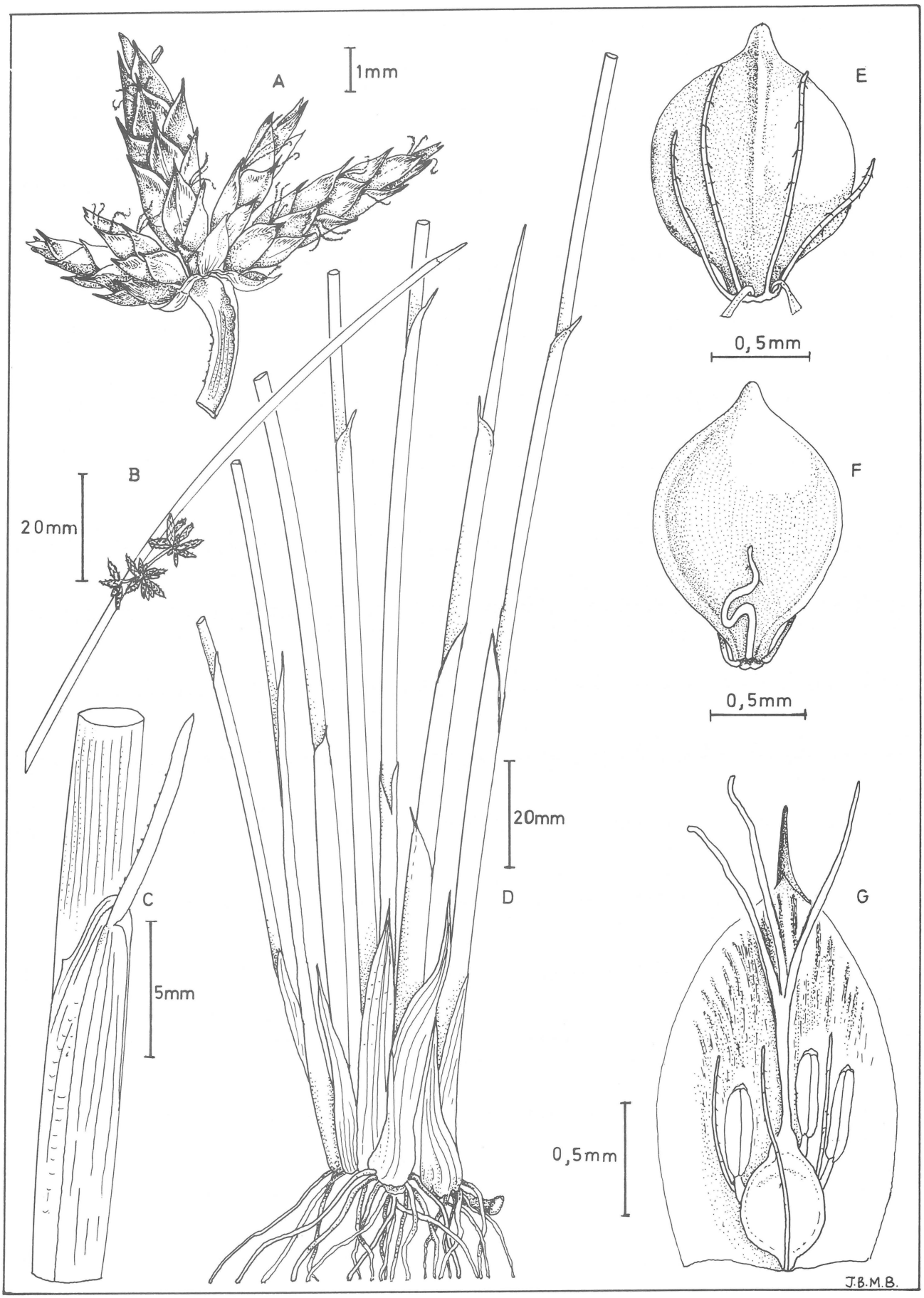

Figure 1 *Schoenoplectus paludicola* (Kunth) Palla ex J. Rayn. (*Browning 147*, NU). A. Spikelets; B. inflorescence; C. reduced leaf blade; D. base of plant; E. achene — abaxial surface; F. achene — adaxial surface; G. young floret.

Figure 2 *Schoenoplectus decipiens* (Nees) J. Rayn. A. Rhizome, culm and inflorescence (*Reid 740*, PRE); B. rhizome, culm and inflorescence (*Acocks 17924*, PRE).

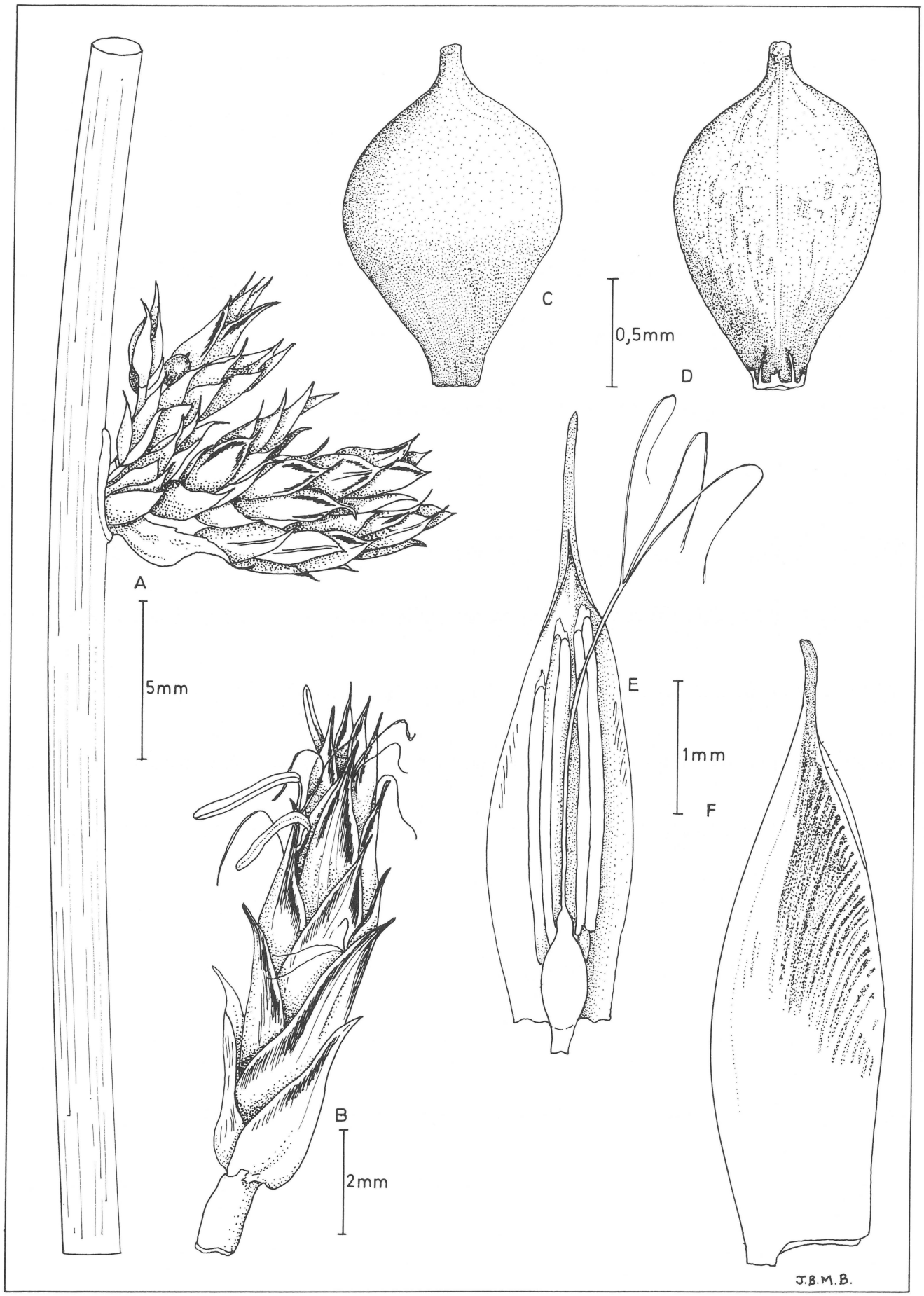

Figure 3 *Schoenoplectus decipiens* (Nees) J. Rayn. (*Taylor 37*, NU). A. Inflorescence bearing mature achenes; B. spikelet; C. achene — adaxial surface; D. achene — abaxial surface; E. floret; F. glume.

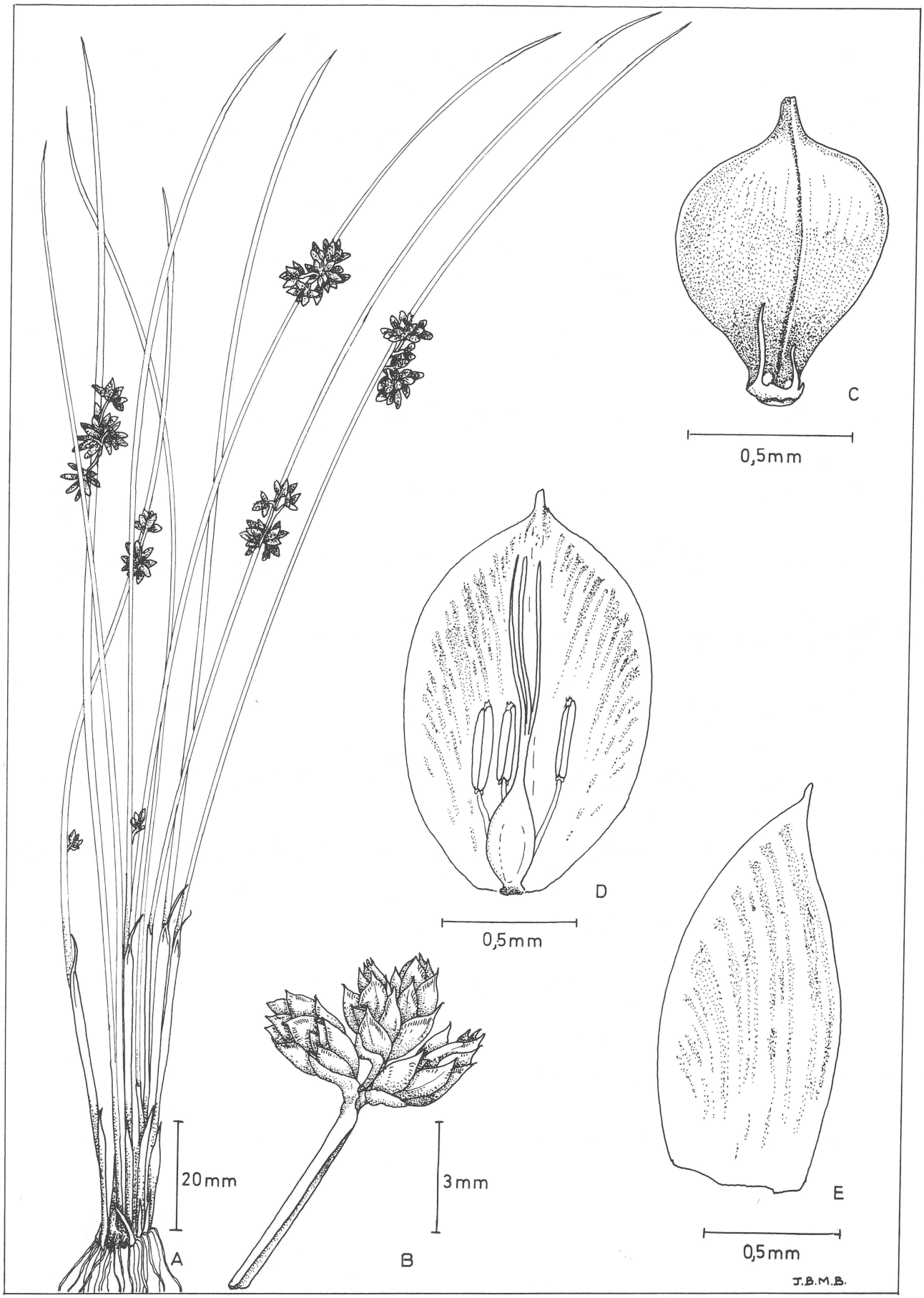

Figure 4 *Schoenoplectus pulchellus* (Kunth) J. Rayn. A. Entire plant (*Reid 1180*, PRE); B. young inflorescence branchlet (*Armour RAK 8*, NU); C. achene — abaxial surface (*Reid 739*, PRE); D. young floret (*Armour RAK 8*, NU); E. glume (*Armour RAK 8*, NU).

sections. Not all the elongate sections were straight as in Figure 2A. Many of the internodes were curved: occasionally nodal branching resulted in shoots on the same continuous rhizome portion being developed at two levels. On these living plants old and younger inflorescences were present; the old were mainly unbranched heads (probably late remnants of the previous season's flowering); young examples were both branched and unbranched, seemingly without correlation to rhizome type, although unbranched heads predominated (no actual counts were made: this was based on general impression only).

Glume colour

Both Raynal (1976) ('... straw-coloured with a purple apex') and Forbes (1987) ('... whitish with dark brown streaks') have referred to what they consider the distinctive glume coloration. This is not constant, specimens from Lesotho (e.g. *Hoener 1614*, NU) having almost black inflorescences with no indication of 'straw-colour' to the glumes. (There are many examples, not only in Cyperaceae, where heavier pigmentation, and therefore stronger coloration, is associated with higher altitudes and more intense insolation. Jermy & Tutin (1968) have drawn attention to this in *Carex*.) Old inflorescences, too, may be deceptive: this is applicable, also, to herbarium specimens long preserved.

Achene surface

The achene has been described as '... smooth or nearly so, shining black when ripe' (Clarke 1898) and '... terne' (lustreless) (Raynal 1976). Present investigations have shown variability in surface sculpturing. A majority of achenes showed the surface to be rugulose, often the adaxial surface only, and particularly evident before full maturity. The degree and extent of the roughness was extremely variable, ranging from almost smooth, to ridges and depressions being well marked and present over both faces and margins (e.g. *Smook 5813*, PRE, Figure 6D).

Robinson (1962) has drawn attention to variability which may arise in achenes in herbarium material of *Scleria* dependent upon the state of development of the fruit at time of collection and the method of drying of the specimen. This must account for some of the variability encountered in *Sch. decipiens*, but not all. There seem to be differences from plant to plant (that is, presumably, in different genotypes).

Hypogynous bristles

In the present study 46 different gatherings possessed achenes that were sufficiently mature to allow effective examination of the perianth bristles. Of these, 32 (70%) lacked bristles; 6 (13%) had 1–3 bristles; 8 (17%) had 4–6 bristles. Specimens with 4–6 bristles were from the eastern Cape; the remainder with fewer or no bristles were scattered throughout the entire distributional range, including the eastern Cape.

Within single spikelets, the absence or presence of bristles and the number, varied within florets (*Lubke*

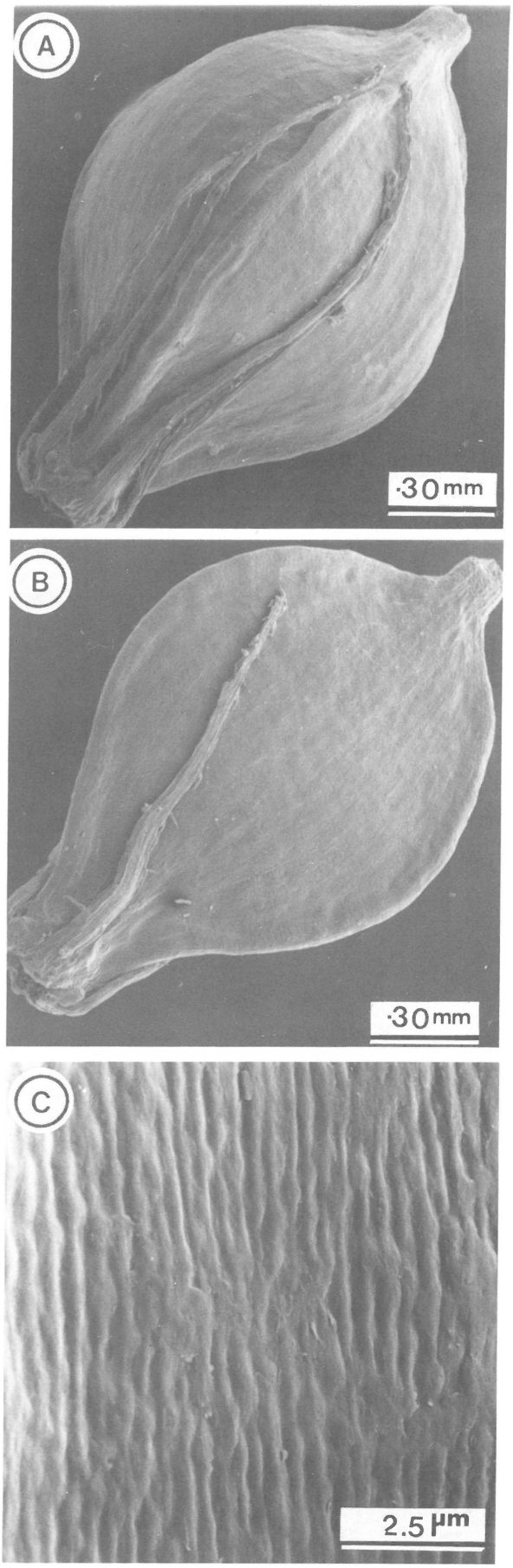

Figure 5 *Schoenoplectus paludicola* (Kunth) Palla ex J. Rayn. (*Wells 1016*, NU). A. Achene — abaxial surface with four hypogyous bristles; B. achene — adaxial surface with one straight hypogynous bristle; C. pericarp epidermal surface.

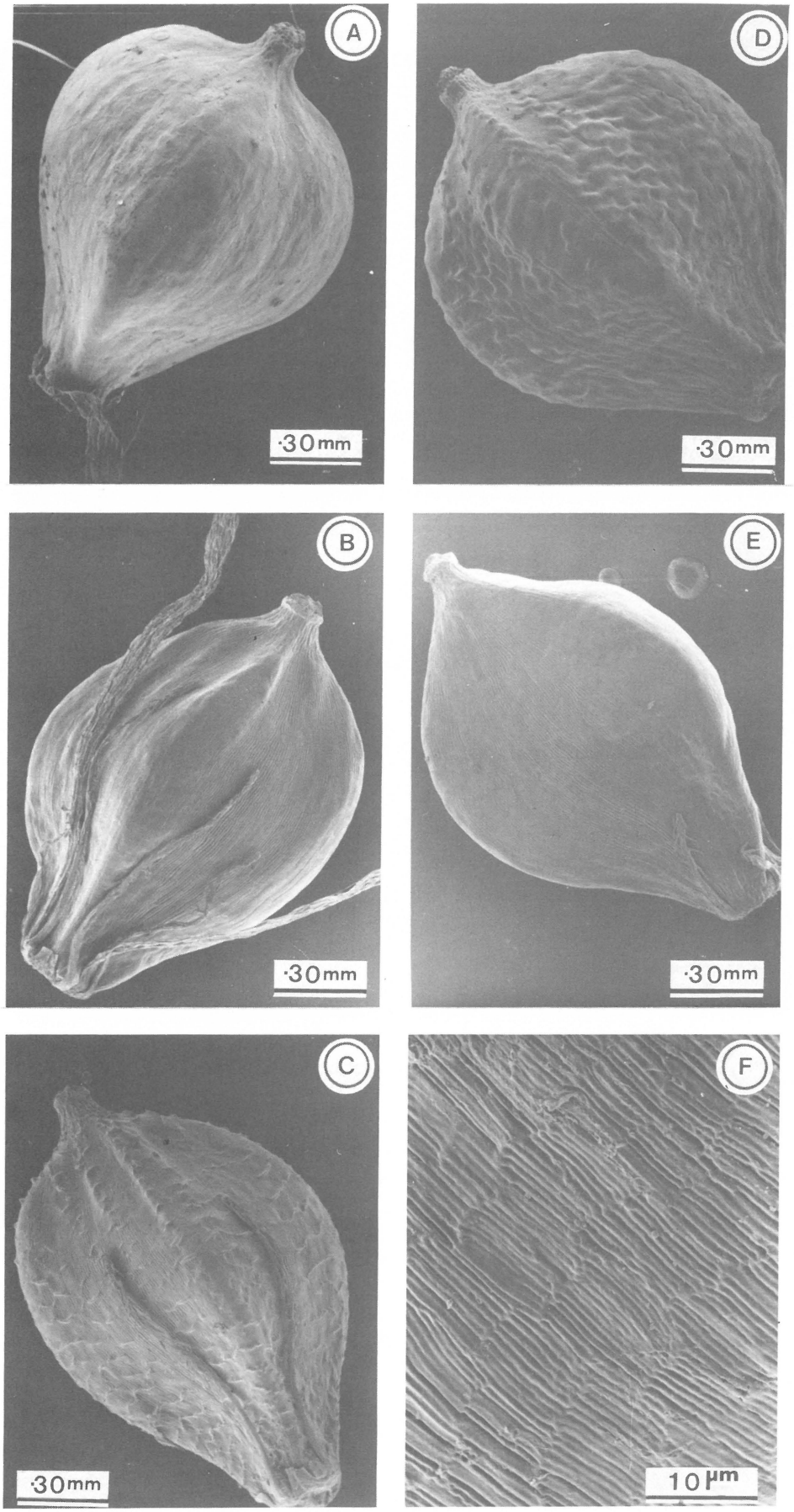

Figure 6 *Schoenoplectus decipiens* (Nees) J. Rayn. A. Achene — smooth, no bristles (*Getliffe 1225*, NU); B. achene — smooth, 3 bristles (*Smook 3981*, PRE); C. immature achene with bristles (*Smook 3981*, PRE); D. achene — rugulose, no bristles (*Smook 5813*, PRE); E. achene — adaxial surface of B. (*Smook 3981*, PRE); F. immature achene — detail of adaxial surface (*Getliffe 1225*, NU). A–D inclusive — abaxial surfaces of achenes.

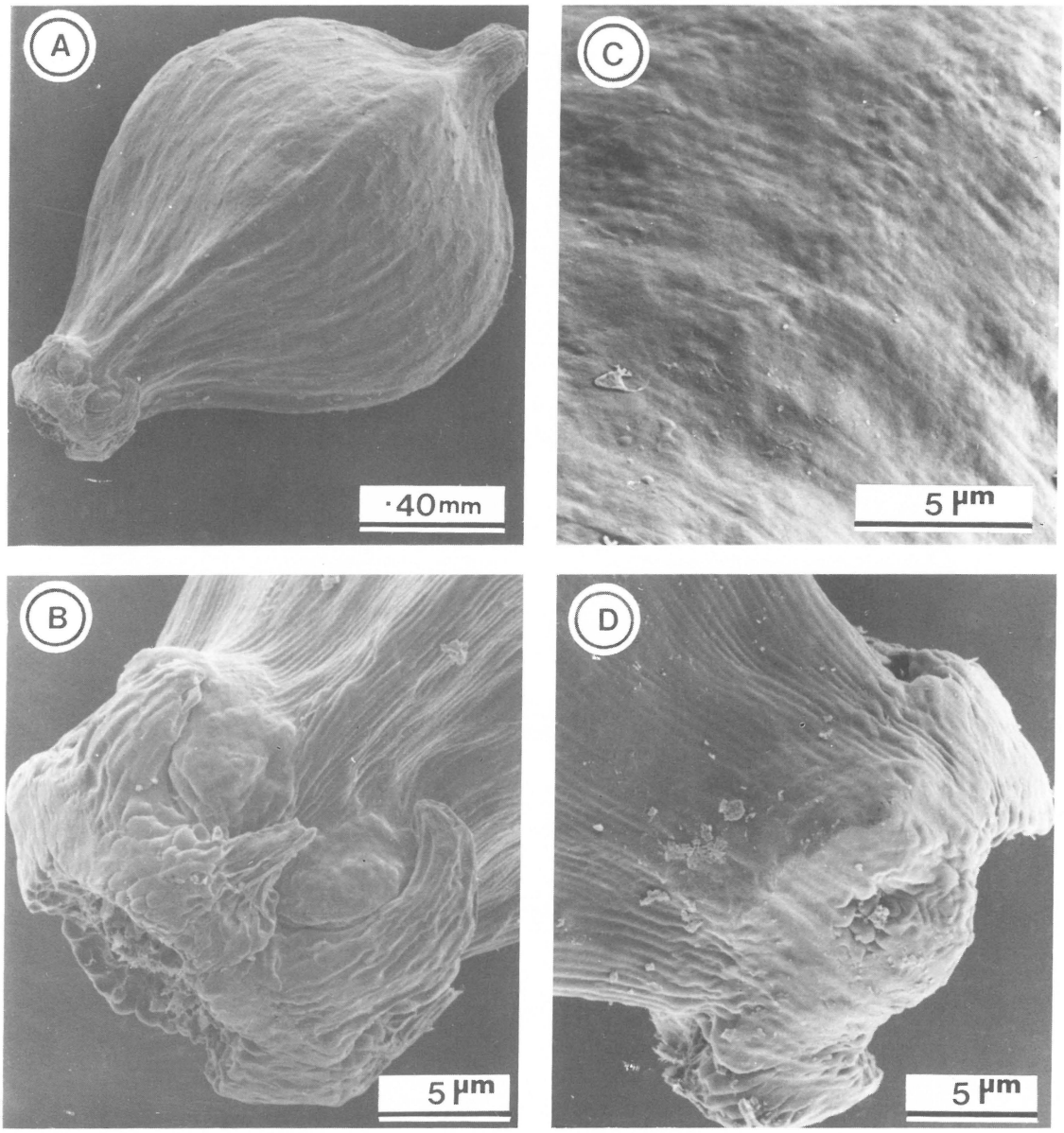

Figure 7 *Schoenoplectus pulchellus* (Kunth) J. Rayn. (*Dieterlen 1335*, SAM). A. Achene — abaxial surface; B. achene base — abaxial surface (note 'horn-like' extensions); C. pericarp epidermal surface; D. achene base — adaxial surface.

106, NH, Fish River Valley, 24 km from Grahamstown, showed florets with 1, 2, 3, 4 and 5 bristles). *Acocks 17924*, K from Queenstown is of special interest since it possessed 6 bristles per floret, the longest 0.9 mm, and carried Raynal's determinavit as *Sch. decipiens*.

Distribution

Plants are known from 25°–34°S latitude and from 30°–21°E longitude in wet areas (vleis, seepages below dams and at the edges of shallow pools) from 100 m in the eastern Cape to 2 350 m in Lesotho. From 25°–22°E longitude there is a similar hiatus in distribution as for *Sch. paludicola*. This requires investigation.

Superficially, therefore, *Sch. decipiens* appears sympatric with *Sch. paludicola*: closer consideration reveals that the heights of the Drakensberg form a divide isolating the lowland, more coastal *Sch. paludicola* from the highland, more inland *Sch. decipiens*. Only south of 30°S latitude is there sympatry and even here field conditions should be closely investigated to determine whether minor altitudinal distinctions and specialized microhabitat preferences operate to keep the species apart on a small scale of distance. (*Lubke 106*, NH, *Sch. decipiens*, and *Dyer 172*, K, *Sch. paludicola*, are both from the vicinity of Grahamstown, which area will repay careful field study. So too, the Swellendam area, the type locality of *Sch. decipiens*). (Figure 9).

In Natal, records are from Franklin only (alt. 1 500–1 520 m: *Getliffe 1225; Taylor 17, 37*, all NU). From Lesotho are collections from altitudes of 2 325–2 350 m. (*Hoener 1614, 2035*, NU). The species should be carefully searched for on the Natal side of the divide where it does not seem to be present. Hilliard & Burtt (1987) recorded the distribution of *Sch. decipiens* as 'lowland and coastal Natal south to Swellendam.' This

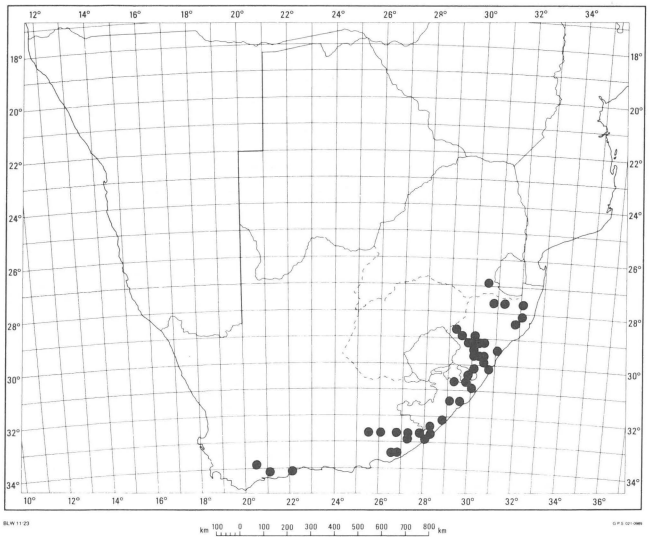

Figure 8 Recorded distribution of *Schoenoplectus paludicola*.

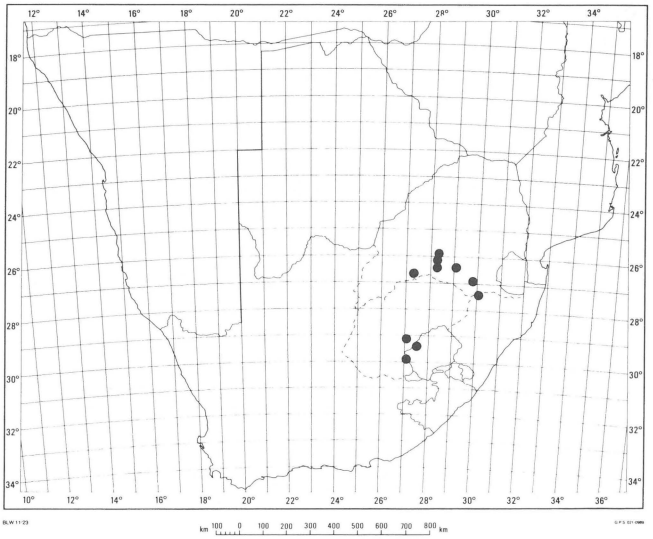

Figure 10 Recorded distribution of *Schoenoplectus pulchellus*.

fits rather *Sch. paludicola* and arose perhaps from consideration of a statement by Schönland (1922), who did not differentiate *Sch. decipiens* from *Sch. paludicola*.

Schoenoplectus pulchellus

Variability

The paucity of gatherings was limiting in the investigation of the variability of this species. Available evidence suggests the taxon is extremely uniform except, perhaps, in plant size. The type, from the Fish River near Grahamstown, is shorter than the Free State and Transvaal plants, but this is an isolated specimen and careful field work in the eastern Cape is needed to determine whether it is representative.

Distribution

Plants are known from 26°–30°S latitude and from 30°–25°E longitude, from wet situations near roadside pools and the edges of pans and dams at altitudes 1 000 m to 2 000 m (the precise altitudinal range needs careful assessment). The type locality is the only known record from the eastern Cape and extends the distributional range considerably. Once more, it is the Fish River in the vicinity of Grahamstown that becomes of special interest. Note: The type locality has not been included in the map since it is difficult to localize: also there seems to have been no recollection for more than 100 years. *Sch. pulchellus* should be looked for in the northernmost parts of northern Natal, since it occurs at Wakkerstroom in the Transvaal (*Davidse 6756*, PRE). (Figure 10).

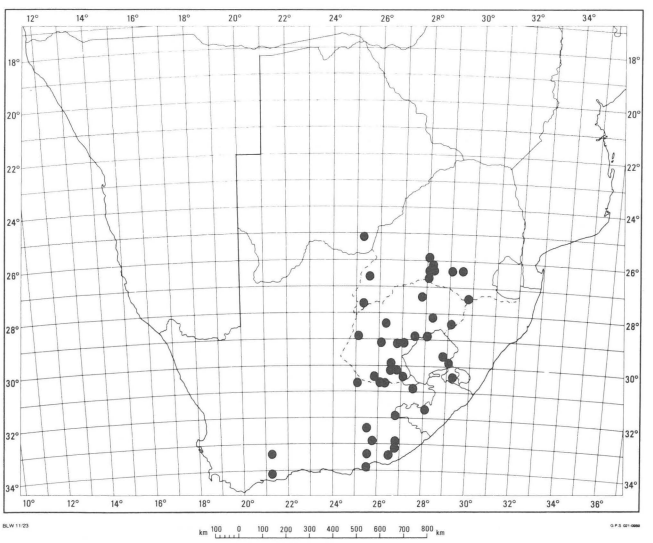

Figure 9 Recorded distribution of *Schoenoplectus decipiens*.

Summary and Conclusions

The present study has shown conclusively the need to uphold J. Raynal (1976) in his establishment of three species rather than the one recognized by Clarke (1898). However, because of previously unrecorded variability within *Sch. decipiens*, the key Raynal provided was found to be not entirely effective in the identification of these species. An alternative key covering the range of variability now known, is proposed.

Study of distribution has revealed that *Sch. decipiens* does indeed favour mountainous regions (higher altitudes) to a greater extent than does *Sch. paludicola*, the heights of the Natal Drakensberg isolating the highland, inland taxon from the lowland, coastal one. Only south of 30°S latitude do the two species become sympatric, the common area of distribution extending to approximately 21°E longitude.

The distribution of *Sch. pulchellus* requires further study. In the Transvaal and Orange Free State, the species coexists with *Sch. decipiens*, but from known gatherings appears far less common. Forbes (1987) remarks '... rarely collected on the Witwatersrand.' It is poorly known from the border area of Transvaal/Natal and should be looked for into midland Natal. The type locality is the Fish River Valley near Grahamstown, from which area it does not appear to have been recollected since Drège's time.

Field study in the eastern Cape, particularly the Fish

River area near Grahamstown, is greatly needed, for here the three species occupy common territory. Whether this sympatry extends to growing side by side, or whether, within limited distance, the three taxa exhibit different altitudinal and microhabitat preferences is still to be determined; also whether *Sch. pulchellus* is still present. There is a need to establish whether the three taxa are sympatric in the Transvaal (adjacent to, perhaps in, Swaziland, approximately 26°S, 30°E) where one gathering indicates the presence of *Sch. paludicola*, but, from known records, not the other two species. Western limits for each taxon also require confirmation.

Formal taxonomy

Key to the species

1. Glumes 2.8–4.5 mm long; anthers linear, exceeding 1 mm in length ..... ***Sch. decipiens***
   Glumes 1.4–2.8 mm long; anthers oblong, less than 1 mm in length **2**
2. Achene 1.2–1.7 mm long, bearing 5 or 6 retrorsely scabrid hypogynous bristles; glume length 1.9–2.8 mm ..... ***Sch. paludicola***
   Achene 0.7–0.9 mm long, hypogynous bristles reduced to 2–3 'horn-like' extensions from a flange at base of achene; glume length 1.5–1.8 mm ..... ***Sch. pulchellus***

Schoenoplectus paludicola *(Kunth) Palla ex J. Raynal*, Adansonia, ser. 2, 15 (4): 541 (1976); Gibbs Russell: 76 (1985).

Scirpus paludicola Kunth: 163 (1837); Boeck.: 703 (1870); C.B. Cl.: 230 (1898), p.p.; Schönland: 39 (1922), p.p.; Ross: 109 (1972). Type: S. Africa, between Key (Kei ?) and Gekau, *Drège 4426* (K, cibachrome!, P, iso.).

Perennial. *Rhizome* woody, short, 3.5 mm in diameter, holding together contiguous tufted stem bases clothed with persistent, erect scale leaves and leaf sheaths. *Roots* numerous, 0.6–1 mm wide. *Culms* contiguous 240–750 mm × 2–3 mm, somewhat terete, glabrous. *Leaves* reduced to 2–3 sheaths obliquely truncate at the top, often bearing a scabrid-margined reduced leaf blade. *Inflorescence* a pseudolateral head or a contracted anthela of clusters of spikelets on 1–5 slender, unequal, scabridulous branches (up to 10 mm long); overtopped by a 40–100 mm tapering bract appearing as a continuation of the culm. *Spikelets* sessile, 4–6 mm × 2–3 mm, ovoid to cylindric, many flowered, chestnut-brown or rust coloured. *Glumes* all fertile, 1.9–2.8 mm × 1.2–1.8 mm, ovate, somewhat keeled, convex, glabrous, streaked reddish-brown with narrow transparent margins, acute to mucronate. *Stamens* 3, anthers 0.4–0.5 mm, oblong, minutely crested. *Bristles* 5–6 stout, unequal, (0.8–1.6 mm), shorter than, or the longer ones slightly exceeding in length the achene shoulders, retrorsely scabrid. *Style* linear 0.7 mm, style-branches 3, 1 mm long. *Achene* 1.2–1.7 mm (from apex of beak to achene base) × 0.8–1.1 mm, ovate to obovate, trigonous with short beak, smooth, shining black at maturity. (Figures 1 & 5A–C).

Selected citations

—2630 (Carolina): 15 km from Piet Retief on road to Amsterdam (–DC), *Arnold 249* (PRE).
—2730 (Vryheid): Hlobane (–DB), *Johnstone 332* (NU).
—2731 (Louwsburg): Itala Nature Reserve, Craigadam Farm (–CB), *McDonald 217* (K, NU, PRE).
—2732 (Ubombo): Ubombo (–CA), *Ward 3817* (NU, PRE).
—2829 (Harrismith): Geluksberg, Bergville Dist. (–CB), *Edwards 2345* (NU, PRE), ibidem *2347* (K, NU, PRE); Winterton Settlement (–DC), *Strey 9356* (K, NH, NU, PRE).
—2830 (Dundee): Weenen Distr. (–CC), *Arnold s.n.* (NU).
—2831 (Nkandla): Umfolozi Game Park (–BD), *Ward 1464* (NU).
—2832 (Mtubatuba): Hluhluwe Game Reserve (–AA), *Ward 2579* (NH, NU).
—2929 (Underberg): Estcourt distr., just after turn off to Estcourt on Mooi River – Giant's Castle rd. (–BB), *Reid 949* (K, NH, PRE).
—2930 (Pietermaritzburg): Mooi River Distr., 16 km along rd. to Middelrus from R622 (–AA), *Reid 633* (PRE); Craigieburn dam — 4 km from Rietvlei (–AB), *Arnold 422* (PRE); Tweedie (–AC), *Mogg 6942* (K, PRE), 1.6 km S. of Currys Post, *Moll 1187* (PRE); Peaties Lake at site of New Albert Falls Dam (–BA), *Musil 199* (NH, PRE); Mt. Ashley (–CA), *Mogg 6372* (K, PRE); Bisley (–CB), *Huntley 509* (K, NU); Lincoln Meade, *Browning 147* (NU); Cato Ridge, Harrison Flats (–DA), *Frankish 314* (NU); Table Mountain P.M.B., *Killick 618* (NU, PRE); Farm dam, Umlaas Road, Camperdown, *Musil 521* (K, PRE).
—2931 (Stanger): Lower Tugela, Glen Mill (–AC), *Moll 2285* (K, PRE).
—3029 (Kokstad): Clydesdale (–BD), *Tyson 2600* (BOL, K, PRE, SAM); Farm Thornham (–CB), *Coleman 706* (NH, PRE); Harding, Rooi Vaal, Distr. R121 (–DB), *Fay Lennox s.n.* (NU).
—3030 (Port Shepstone): Farm dam 10 km from Highflats on Ixopo road (–AA), *Musil 502* (NH, PRE); St. James Anglican Church 4 km E. of Highflats (–AC), *Reid 574* (PRE); Isipingo Beach (–BB), *Ward 736* (NU); Funzi Drift, Izingolweni, Thembalihle Station (–CC), *Ram 54* (NU).
—3129 (Port St Johns): Umzimvubu River, Port St. Johns (–AC), *Schelpe 292* (NU); Near Lusikisiki (–BC), *Gordon-Gray K.D. 1998* (NU).
—3225 (Somerset East): Besters Hoek (–DA), *Hilliard & Burtt 13251* (NU, PRE).
—3226 (Fort Beaufort): Above Turpin Dam, Bedford (–CA), *Acocks 16261* (K, PRE); Amatole Mountains, Valley between Menziesberg and Pefferskop (–DB), *Phillipson 1328* (PRE).
—3227 (Stutterheim): Dohne P.R. Stn. (–CB), *Acocks 8899* (PRE); King Williamstown (–CD), *Sim 2854* (NU, PRE); Marshy places, near Komgha (–DB), *Flanagan 1259* (BOL, PRE, SAM).
—3228 (Butterworth): District Kentani (–AD), *Pegler 200* (BOL); Elliotdale Distr., The Haven (–BB), *Gordon-Gray J.L. 649* (NU); About 8 km from coast on Kei Mouth rd. (–CB), *Dyer 4497* (PRE); Haga Haga (–CC), *Gordon-Gray K.D. s.n.* (NU).
—3320 (Montagu): Buffelsjagt (–DC), *Levyns 708* (BOL).
—3326 (Grahamstown): Near Grahamstown (–BC), *Dyer 172*

(K); Grahamstown, *Fairall. s.n.* (NU); Combs near Combsvale farm (–BD), *Arnold 636* (K, PRE).

—**3421** (Riversdale): By sluits at Oakdale (–AA), *Muir 3033* (PRE).

—**3422** (Mossel Bay): 8 km W. of Mossel Bay (–AA), *Acocks 22204* (K, PRE); Near Brandwacht, to south, *Acocks 21332* (K, PRE).

Schoenoplectus decipiens *(Nees) J. Raynal,* Adansonia, ser. 2, 15(4): 540 (1976); Gibbs Russell: 76 (1985); Forbes: 61 (1987); Hilliard & Burtt: 115 (1987).

Isolepis decipiens Nees: 291 (1834), : 157 (1835). Lectotype (here designated): S. Africa, Zwellendam [Swellendam], between Kochmannskloof [Boschmanskloof] and Gaurit River; *Ecklon & Zeyher s.n.* (K, cibachrome!; P, isolecto.).

Isolepis paludicola Kunth: 198 (1837). Type: S. Africa, without locality, *Drège 3959a* (P, iso.)

Scirpus paludicola auct., *non* Kunth Boeck.: 703 (1870); C.B. Cl.: 230 (1898), *p.p.*; Schönland: 39 (1922), *p.p.*

Scirpus paludicola Kunth var. *decipiens* (Nees) C.B. Cl.: 629 (1894).

Perennial. *Rhizome* 3–4 mm in diameter, woody, abbreviated, bearing tufted stem bases enveloped by erect scale leaves and leaf-sheaths; or creeping horizontally with extended internodes, straight or curved. *Roots* numerous, 0.5–1 mm wide. *Culms* contiguous or widely separated, 80–800 mm × 1.5–4 mm, usually terete, glabrous. *Leaves* reduced to 2–3 sheaths obliquely truncate at the top, sometimes bearing a scabrid-margined leaf-blade. *Inflorescence* a pseudolateral head of digitately arranged spikelets; occasionally an anthela, with 1–3, 5–20-mm long, slender, unequal, scabridulous branches, overtopped by a 20–90-mm tapering bract appearing as a continuation of the culm. *Spikelets* sessile, 1–6 per head or branch, 5–10 mm × 3–5 mm, many-flowered, strobilaceous, whitish with dark brown markings or almost black at high altitudes. *Glumes* all fertile, 2.8–4.5 mm × 1.5–2.4 mm, oblong lanceolate, keeled, glabrous, whitish to straw-coloured overlaid submarginally by dark brown streaks frequently arranged in an inverted V about the midrib, occasionally uniformly very dark, mucronate-aristate. *Stamens* 3, anthers, 1–1.75 mm, linear, minutely crested. *Bristles* 0–6; when present, delicate, unequal, of variable length (0.1–1.2 mm), but not exceeding in length the achene shoulders, retrorsely scabridulose. *Style* linear, 0.6–2.0 mm, style branches 3, 1.7–3.2 mm long, papillose. *Achene* 1.3–1.9 mm (from apex of beak to achene base) × 0.9–1.3 mm, ovate to obovate, trigonous with short beak, clearly or faintly rugulose (faces and margins) or smooth, dark brown or black at maturity. (Figures 3 & 6A–F).

Selected citations

—**2525** (Mafeking): Source of Ramongala river, Dist. Kanye (–AB), *Hillary & Robertson 582* (PRE).

—**2528** (Pretoria): Halfway House (–CC), *Sym 55* (J).

—**2625** (Delareyville): Zandvalei 301 (–DA), *Skead 378* (PRE).

—**2628** (Johannesburg): Marshy ground near Boksburg Tvl. (–AB), *Murray s.n.* in PRE 39192 (PRE); Near Daleside (–AC), *Forbes 392* (J); 47 km SSE of Heidelberg (–AD), *Acocks 20837* (PRE); Burttholm, Vereeniging (–CA), *Burtt-Davy 15208* (BOL).

—**2629** (Bethal): Vlakpan north of Kinross on road to Grootpan (–AC), *Reid 740* (PRE); 11 km east of Bethal on road to Ermelo (–BC), *Reid 787* (PRE).

—**2725** (Bloemhof): S.A. Lombard Nature Reserve (–CB), *Leistner 133* (PRE).

—**2727** (Kroonstad): Heilbron (–BD), *Goossens 519* (BLFU).

—**2729** (Volksrust): Volksrust (–BD), *Werdermann 1230* (PRE).

—**2825** (Boshof): Berlyn (1580) at junction of Dealesville – Hertzogville and Boshof – Bultfontein roads (–CC), *Muller 1291* (PRE).

—**2826** (Brandfort): 5 km from Bultfontein on road to Brandfort (–AC), *Smook 002741* (PRE).

—**2828** (Bethlehem): Leribe (–CC), *Dieterlen 733* (K, PRE, SAM).

—**2829** (Harrismith): 'Frazerspruit', Harrismith (–AC), *Blom 265* (PRE).

—**2926** (Bloemfontein): Thaba 'nchu (–BB), *Peeters, Gericke et al. 459* (PRE); 40 km S. of Dewetsdorp Farm, Bloemspruit (–DC), *Smook 5813* (PRE).

—**2927** (Maseru): Near Tweespruit (–AA), *Armour RAK 24* (NU).

—**2928** (Marakabei): Sehonghong (–DB), *Schwabe D023* (NU).

—**2929** (Underberg): Sehlabathebe Nat. Park, Maal Cof. (–CC), *Hoener 2116* (NU, PRE).

—**3025** (Colesberg): 16 km SW of Colesberg (–CA), *Acocks 16309* (K, PRE).

—**3026** (Aliwal North): Smithfield, Municipal Dam (–BA), *v. Zinderen Bakker 38* (PRE); 19 km NW of Zastron (–BB), *Smook 5894* (PRE); T.D.R. Game farms, on farm Weltevreden, Bethulie (–CB), *Muller 1078* (PRE).

—**3027** (Lady Grey): Dam at Zastron campsite (–AC), *Reid 152* (PRE); 1.3 km SE of New England Stn. (–DC), *Acocks 20155* (K, PRE).

—**3029** (Kokstad): Franklin's Marsh (–AD), *Getliffe 1225* (NU), Ruswarp, Franklin, *Taylor 17, 37* (NU).

—**3126** (Queenstown): 8 km SE of Queenstown (–DD), *Acocks 17924* (K, PRE).

—**3128** (Umtata): Shiloh (–CA), *Baur 778* (BOL).

—**3224** (Graaf Reinet): Cave Mt. near Graaf Reinet (–BC), *Bolus s.n.* in BOL 771 (BOL).

—**3225** (Somerset East): 16 km SE of Cookhouse on Paryshoogte Rd. (–DD), *Smook 3981* (PRE).

—**3321** (Ladismith): Ladismith (–AD), *Levyns 4198* (BOL).

—**3325** (Port Elizabeth): 'In humidis ad Zwartkops' (–DC), *Zeyher 4386* (PRE); Korhaan Vlakte, Addo National Park (–BD), *Archibald 5267* (K, PRE).

—**3326** (Grahamstown): Fish River Valley, 24 km from Grahamstown (–BB), *Lubke 106* (NH); Land around Cradock road pond (–BC), *Silberbauer 27* (PRE).

—**3421** (Riversdale): Marshes near Vet R. (–AB), *Muir 2872* (PRE).

Schoenoplectus pulchellus *(Kunth) J. Raynal,* Adansonia, ser. 2, 15(4): 542 (1976); Gibbs Russell: 76 (1985).

Ficinia pulchella Kunth: 261 (1837). Type: S. Africa, Cape, Grahamstown Div., Fish River, *Drège 4427* (K!, P; iso.).

Scirpus pulchellus (Kunth) Boeck.: 698 (1870).

Scirpus paludicola auct. *non* Kunth: C.B. Cl.: 230 (1898), *p.p.*

Perennial. *Rhizome* abbreviated, 2 mm in diameter when dry, holding together contiguous tufted stem bases clothed with persistent, erect scale leaves and leaf sheaths. *Roots* numerous, 0.5 mm wide. *Culms* contiguous 90–560 mm × 1 mm, somewhat terete, glabrous. *Leaves* reduced to 2–3 membranous sheaths, uppermost terminating in a 2–8 mm scabrid-margined, reduced leaf blade. *Inflorescence* a pseudolateral 'loose' head of clusters of spikelets on 4–5 unequal branches (longest branch usually 10 mm long), overtopped by a bract 40–130 mm appearing as a continuation of the culm. *Spikelets* sessile, 3.5–4.5 mm × 1.5–2 mm, ovoid to oblong-ovoid, terete, many-flowered, dark brown to almost blackish at maturity. *Glumes* all fertile, 1.4–1.7 mm × 0.9–1.5 mm, ovate to broadly ovate, keeled, convex, glabrous, dark reddish-brown to almost black with narrow transparent margins, acute to mucronate. *Stamens* 3, anthers 0.25–3 mm, oblong-elliptic to oblong, minutely crested. *Bristles* 0, reduced bristle bases form a small cushion of tissue bearing 2–3 horn-like outgrowths that are adpressed or slightly divergent apically from the basal abaxial achene surface. *Style* linear 0.4 mm, style-branches 3, 0.6 mm long, slightly flattened. *Achene* 0.7–0.9 mm (from apex of beak to achene base) × 0.5–0.6 mm, obovate, sharply trigonous with short beak, smooth, black at maturity. (Figures 4 & 7A–D).

Citations

—2528 (Pretoria): Van Riebeeck Nature Reserve (–CD), *Kok 252* (PRE).

—2627 (Potchefstroom): Hartebeestpoort (–CB), *Louw 1685* (PRE).

—2628 (Johannesburg): Swamp near Benoi (Benoni?), Witwatersrand (–AB), *Moss 11200* (K), Near Boksburg, *Murray* in PRE 39271 (PRE); Springs (–AD), *Moss 9701* (K).

—2629 (Bethal): Vlakpan north of Kinross on road to Grootpan (–AC), *Reid 739* (PRE); 4 km north of Amersfoort on road to Ermelo (–DD), *Reid 1180* (PRE).

—2730 (Vryheid): 2.5 km NW of Wakkerstroom along road to Amersfoort (–AC), *Davidse 6756* (PRE).

—2927 (Maseru): Near Tweespruit (–AA), *Armour RAK 8* (NU); St. Michaels (–BC), *Schmitz 7502* (PRE); Mafeteng (–CC), *Dieterlen 1335* (PRE, SAM).

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